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PENSOFT

First record of the termite, *Dentispicotermes cupiporanga* Bandeira & Cancello, 1992 (Isoptera, Termitidae, Termitinae) from Venezuela and new genus records from Bolivia and Paraguay

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Abstract
Dentispicotermes Emerson, 1950 comprises five species confined to the Neotropics. We report the presence of *D. cupiporanga* Bandeira & Cancello, 1992 in northern Venezuela and two undescribed congeners from Bolivia and Paraguay. This soil-feeding termite genus is rare and is characterized by a diagnostic enteric valve armature that we describe for the first time.

Keywords
Distribution, enteric valve armature, soldier, worker.

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Introduction

The subfamily Termitinae is a polyphyletic group (Inward et al. 2007) of primarily tropicopolitan soil and wood feeding termites (Krishna et al. 2013). The genus *Dentispicotermes* Emerson, 1950 is an uncommon South American soil-feeding group. Five species are described including *D. brevicarinatus* (Emerson, 1950); *D. conjunctus* Araújo, 1969; *D. cupiporanga* Bandeira; Cancello, 1992; *D. globicephalus* (Silvestri, 1901); and *D. pantanalis* Mathews, 1977. As in numerous Neotropical termitine genera, the soldiers have snapping mandibles (Emerson 1950), which are among the fastest animal movements known (Seid et al. 2008). Soldiers of *D. cupiporanga* are easily distinguished from its congeners by its larger size combined with offset teeth on the inner margins of the mandibles. Until now, *D. cupiporanga* has only been reported from Brazil (Bandeira and Cancello 1992; Araújo et al. 2017).

Over the last decade, the enteric valve armature (EVA) of the worker caste, especially in soil-feeding species, has become a diagnostic, robust, and character-rich structure (Bourguignon et al. 2016). In fact, the description of soldierless termites is often dependent on the morphology of the EVA (Scheffrahn et al. 2017). Likewise, the EVA is useful for the identification of workers in species in which soldiers are rare or not often collected such as *Dentispicotermes*.

Herein, we report for the first time *Dentispicotermes* (as *D. cupiporanga*) from northwestern Venezuela and

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describe the worker EVA. We also report the localities of undescribed congeners from Bolivia and Paraguay.

Methods

Termites were aspirated from soil underneath rocks and preserved in 85% ethanol. All samples are housed in the University of Florida Termite Collection (UFTC), Davie, Florida. A soldier of *Dentispicotermes cupiporanga* from Venezuela (UFTC no. VZ1065) was photographed as multi-layer montages using a Leica M205C stereomicroscope controlled by Leica Application Suite v. 3 (Fig. 1). The EVA of a *D. cupiporanga* worker (VZ912) was dissected and slide-mounted (Fig. 2A) following the procedure of Scheffrahn et al. (2017). The *Dentispicotermes* locality map was prepared using ArcMap v. 10.3 (ESRI 2015; Fig 3). Google Earth Pro® (Google LLC 2019) was used to estimate elevations.

Results

Dentispicotermes cupiporanga Bandeira & Cancello, 1992

New records. VENEZUELA • 12 workers; Estado Falcón, La Peña; 11.10959, −69.74886; 917 m a.s.l.; 28 May 2008; R. Scheffrahn; under rock; UFTC no. VZ912 • 15 workers; Estado Lara, El Porvenir semi-dry forest; 10.44095, −69.44018; 590 m a.s.l.; 28 May 2008; J. Chase; VZ1064 • 34 workers, one soldier; same collection data as for preceding; J. Mangold; VZ1065 • 40 workers, larvae; Estado Lara, Road south of Sanare; 9.81319, −69.62881; 1016 m a.s.l.; 29 May 2008; P. Ban; VZ1164.

Table 1 provides collection data of all known *Dentispicotermes* localities from both literature reports and new UFTC records with the exception of new *D. cupiporanga* records given above. All UFTC records were made available by Scheffrahn (2019).

Identification. All original descriptions of *Dentispicotermes* soldiers are reliable with the exception of *D. globicephalus* (Silvestri 1901, Silvestri 1903). Bandeira and Cancello (1992) provide a detailed drawing of the *D. cupiporanga* soldier head while Mathews (1977) and Constantino (2002) provide good line drawings of the heads of soldiers of *D. pentanalis* and the *D. globicephalus*, respectively.

Mathews (1977: pl. 27) was the first and only author to provide a figure of the EVA of a *Dentispicotermes* worker (*D. pentanalis*), although without description or comment. The resolution of Mathews' (1977) photograph, however, is very poor. Therefore, a detailed description of a *Dentispicotermes* worker EVA follows. The anterior EVA of the *D. cupiporanga* (Fig. 2A) consists of six cushions composed of wrinkly scales. The cushions become wider and some scales become adorned with short spines at their posterior (toward the paunch or

Figure 1. Dorsal, lateral, oblique, and ventral aspects of the soldier of *Dentispicotermes cupiporanga* from Venezuela.

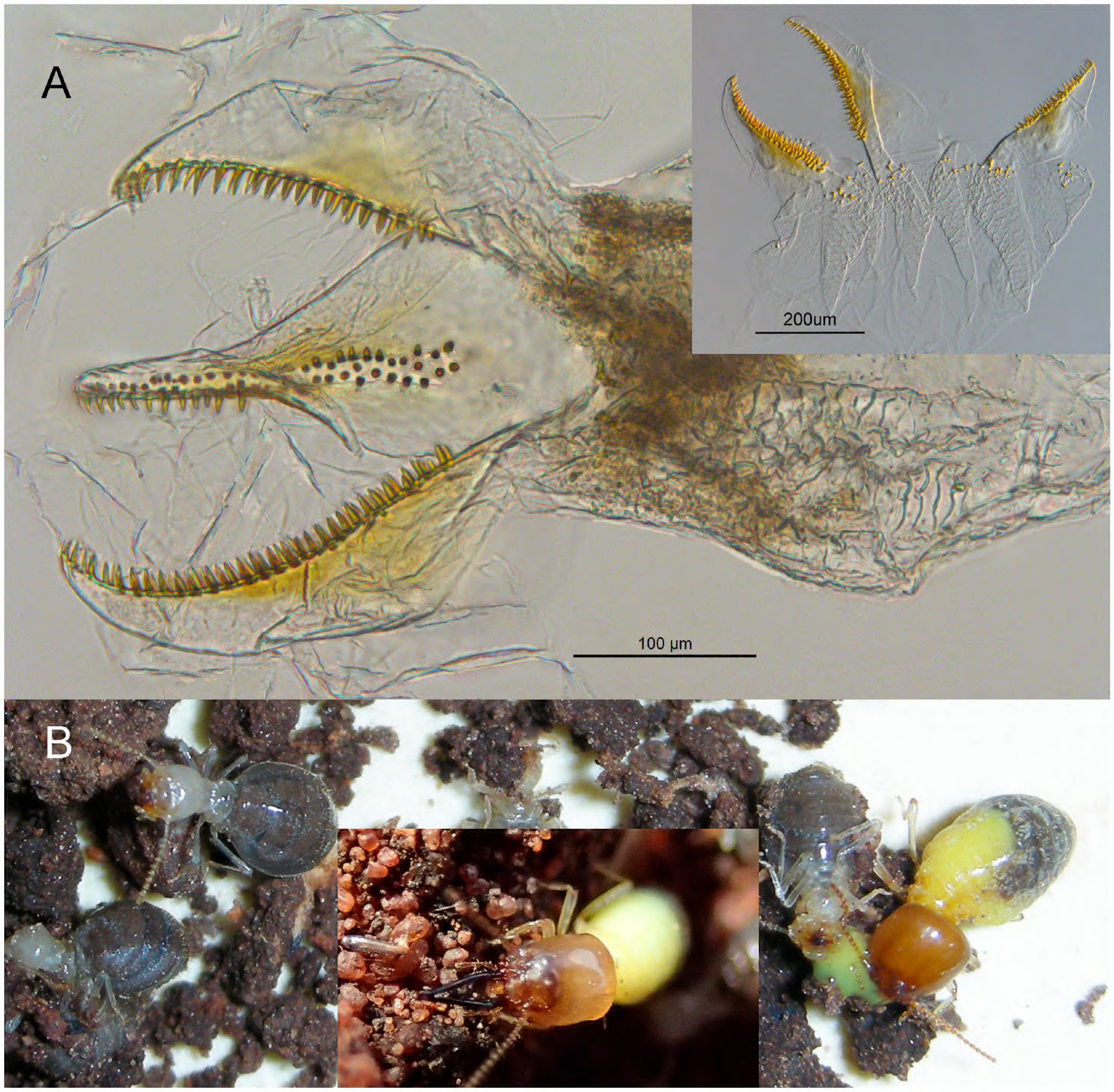

Figure 2. A. Enteric valve armature of *Dentispicotermes cupiporanga* from Venezuela as a whole mount (food flows from right to left) and a splayed mount (inset). The whole mount contains residual food particles and bacteria within the cushions. **B**. Habitus of *Dentispicotermes* sp. soldiers and workers from Paraguay.

P3). The positions of the three smaller cushions alternate between those of the three larger ones. A large tentacle-like outgrowth projects into the lumen of the paunch from the posterior of each of the larger cushions. These three projections are semielliptical in lateral view and each has two to three rows of inward facing, longer conical spines resembling canine teeth. The EVAs of other *Dentispicotermes* spp. have a very similar gestalt to that of *D. cupiporanga* (RHS unpubl. observation). Workers of *Dentispicotermes* spp. have very globous abdomens (Fig. 2B).

As first noted by Araújo (1969), the yellowish anterior of the soldier abdomen is a distinguishing feature of the genus. This coloration is the result of defensive fluid stored in the labial gland and is released through the mouth (Fig. 2B). Immediately after immersion in ethanol, the fluid congeals into a rubbery mass.

Discussion

We report, for the first time, the occurrence of a *Dentispicotermes* (*D. cupiporanga*, Figs 1, 2A) in Venezuela from a semiarid forest biome of Falcón and northern Lara states. These new records extend the known range of *D. cupiporanga* by about 1,250 km northwest (Fig. 3). The Venezuela localities encompass the xeric Guajira and Venezuelan provinces within the Pacific dominion of Morrone (2017), while the nearest previously known *D. cupiporanga* localilty (Fig. 3) is within the hydric Boreal Brazilian dominion. We also report two undescribed *Dentispicotermes* species from Paraguay (Figs 2B, 3), one being the southernmost record, and at least one species from Bolivia (Fig. 3). The latter localities constitute semiarid forests of the humid Chaco. The distribution of the genus *Dentispicotermes* is expansive (Fig. 3),

Table 1. Literature and UFTC localities for *Dentispicotermes*.

Species	Country	Locality	Latitude	Longitude	Elev. (m)	Ref. or UFTC no.
D. brevicarinatus	British Guiana	Oronoque River	2.71	−57.416	213	Emerson 1950
D. brevicarinatus	British Guiana	Itabu Creek	1.700	−57.916	610	Emerson 1950
D. brevicarinatus	French Guiana	St. Eugène	4.983	−53.13	83	Davies et al. 2003
D. conjunctus	Brazil	Minas Gerais: Poços de Caldas	−21.838	−46.565	1264	Araujo, 1969
D. cupiporanga	Brazil	Roraima: Ilha de Maracá	3.42	−61.67	175	Bandeira and Cancello 1992
D. globicephalus	Brazil	Mato Grosso: Cuiabá	−15.6	−56.1	164	Silvestri 1901
D. pantanalis	Brazil	Mato Grosso: Xavantina	−14.75	−52.36	349	Mathews 1977
D. globicephalus	Brazil	Paraíba: Areia	−6.967	−35.733	614	Moura 2012
D. globicephalus	Brazil	Pemambuco: Pesqueria	−8.317	−36.683	931	Moura 2012
D. globicephalus	Brazil	Pemambuco: Floresta	−8.650	−38.017	918	Moura 2012
D. globicephalus	Brazil	Ceará: Barbalha	−7.367	−39.317	784	Moura 2012
D. conjunctus	Brazil	Bahia: Elisio Meldrado	−12.867	−39.467	684	Moura 2012
D. sp.	Brazil	Mato Grosso: Cotriguacu	−9.821	−58.296	258	de Paula 2016
D. cupiporanga	Brazil	Minas Gerais: Viçosa	−20.75	−42.88	702	Araújo et al. 2017
D. globicephalus	Brazil	Mato Grosso: Cáceres	−16.02	−57.72	122	Plaza and Galbiati 2017
D. conjunctus	Brazil	Paraíba: Mata do Buraquinho	−7.144	−34.86	44	Ernesto et al. 2014
D. sp. nov. 2	Bolivia	Chochís	−18.107	−60.087	510	B0816
D. sp.	Bolivia	Chochís	−18.107	−60.087	510	B0817
D. brevicarinatus	French Guiana	Saut Mouche	5.068	−53.059	33	FG740
D. sp.	Paraguay	Yby Yaú	−22.708	−56.288	216	PA312
D. sp. nov. 1	Paraguay	Private forest reserve	−23.050	−56.728	151	PA573
D. sp. nov. 2	Paraguay	N. Villa Florida	−26.310	−57.155	158	PA1199

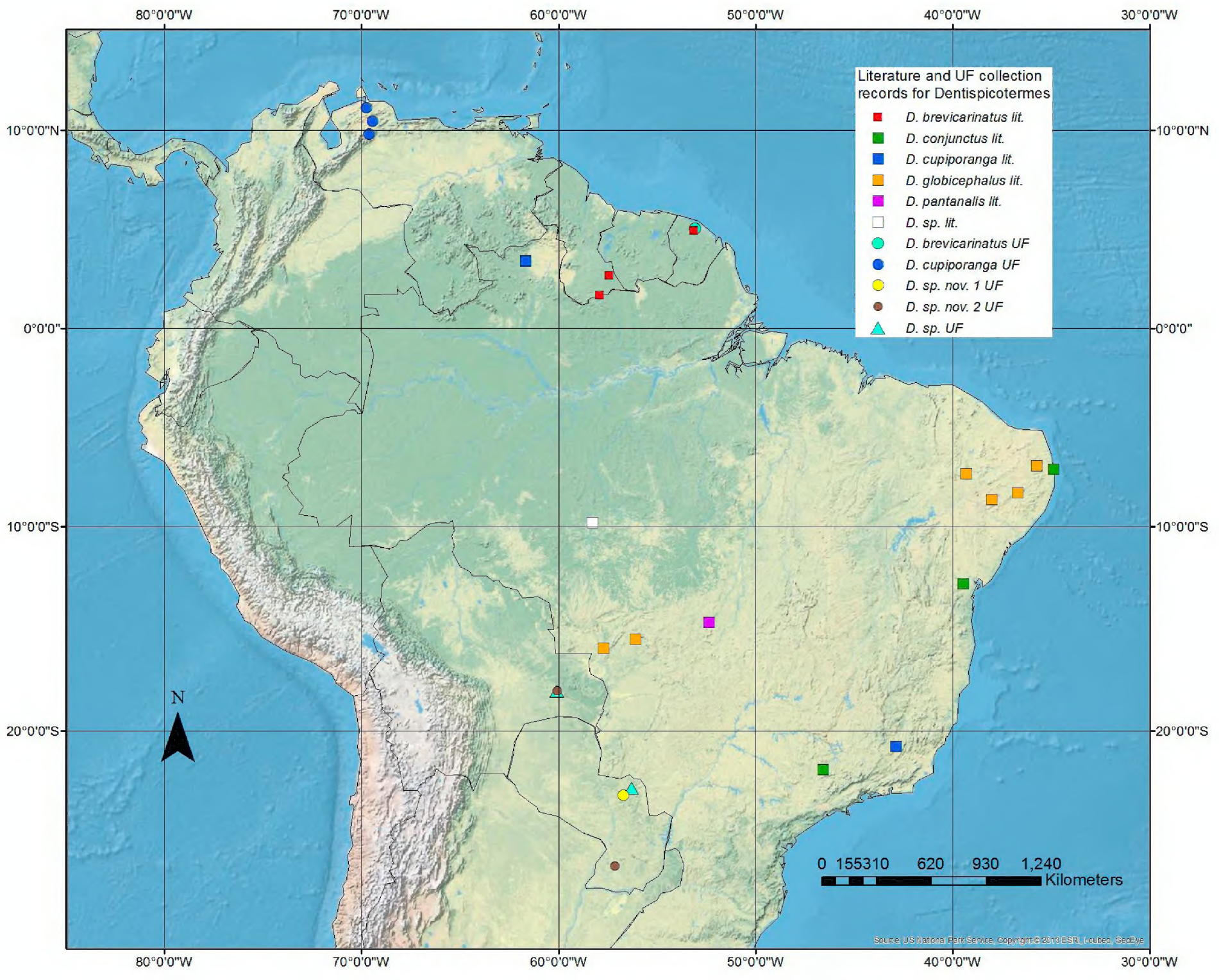

Figure 3. Locality map of *Dentispicotermes* spp. from the literature (lit.) and University of Florida Termite Collection (UFTC) taken from Table 1.

ranging from the rainforests of French Guiana with over 3 m of annual rainfall (*D. brevicarinatus*) to semi-arid landscape at the northern Venezuela, the humid Chaco and the Brazilian Atlantic Forest with 300–1000 mm annual rainfall (Huber and Oliveira 2010). This implies that the genus is adapted to relatively wide ranges of precipitation and temperature. The genus is found at elevations from near sea level to over 1000 m (Table 1). *Dentispicotermes* is a rare genus. Of the 2,633 UFTC colony samples of termitines from South America, only 10 are species of *Dentispicotermes*.

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Authors' Contributions

RHS collected the specimen and produced the figures. SI arranged the expedition, accompanied RHS and other collectors in Venezuela, and acquired collecting permits. RHS and SI wrote the manuscript.

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